with, have, have a property of, or the like; and the term "controller" means any device, system or part thereof that controls at least one operation, such a device may be implemented in hardware, firmware or software, or some combination of at least two of the same. It should be noted that the functionality associated with any particular controller may be centralized or distributed, whether locally or remotely. Definitions for certain words and phrases are provided throughout this patent document, those of ordinary skill in the art should understand that in many, if not most instances, such definitions apply to prior, as well as future uses of such defined words and phrases.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] For a more complete understanding of the present disclosure and its advantages, reference is now made to the following description taken in conjunction with the accompanying drawings, in which like reference numerals represent like parts:

[0015] FIG. **1** illustrates a communication network that updates Android™-based wireless devices using APK files according to an embodiment of the disclosure.

[0016] FIG. **2** illustrates an exemplary packaged XML, file produced by an Android™ package manager according to the principles of the present disclosure.

[0017] FIG. **2**B illustrates an example of a certificate or signing key that is generated for an APK file according to the principles of the present disclosure.

[0018] FIG. **3** illustrates in greater detail an exemplary mobile phone that optimizes APK files in order to improve storage space according to embodiments of the disclosure.

[0019] FIG. **4** illustrates the operation of an Android™ package manager in the exemplary mobile phone according to embodiments of the disclosure.

[0020] FIG. **5** is a flow diagram illustrating the operation of the package optimizer function according to the principles of the disclosure.

DETAILED DESCRIPTION

[0021] FIGS. **1** through **5**, discussed below, and the various embodiments used to describe the principles of the present disclosure in this patent document are by way of illustration only and should not be construed in any way to limit the scope of the disclosure. Those skilled in the art will understand that the principles of the present disclosure may be implemented in any suitably arranged wireless device based on an Android™ platform.

[0022] The present disclosure describes systems and methods for reducing wasted storage space on an Android™-based device. This is done by taking advantage of the fact that the specifications of each target Android™ device is known and the APK file can be pared down to eliminate unnecessary resources in the APK file. In particular, the disclosed systems and methods reduce ROM usage of applications by removing duplicated and unused resources that are added just for compatibility purposes but are not necessary for a target device having a particular configuration to operate. The edited application in the APK file is then re-packaged with a different signing key. The storage occupancy becomes more critical in low storage memory devices in which the saved storage space may be used more productively.

[0023] FIG. **1** illustrates communication network **100**, which updates Android™-based wireless devices using Android™ APK files according to an embodiment of the disclosure. Wireless network **100** includes base station (BS) **111** and BS **112**. BS **111** and BS **112** may communicate with each other via wireless links or by a wireline backbone network (e.g., optical fiber, DSL, cable, T1/E1 line, etc.). By way of example, in FIG. **1**, each of base stations **111** and **112** is configured to communicate with other base stations using Internet protocol (IP) network **110**, which may be, for example, the Internet, a proprietary IP network, or another data network. Each of base stations **111** and **113** is also configured to communicate with a conventional circuit-switched telephone network (not shown), either directly or by means of network **110**.

[0024] BS **111** provides wireless broadband access to network **110** to a first plurality of Android™-based mobile devices within a coverage area of BS **111**. The first plurality of UEs includes mobile phone **121**, among others. BS **112** provides wireless broadband access to network **110** to a second plurality of Android™-based mobile devices within a coverage area of BS **112**. The second plurality of Android™-based mobile devices includes UE **122** and **123**, among others. Each one of mobile devices **121-123** may be any of a number of types of wireless devices, including a wireless-enabled laptop computer, a personal data assistant, a notebook, a mobile phone, a tablet, or another wireless-enabled device.

[0025] It is noted that the term "base station" may be commonly used in some types of networks, such as CDMA2000 systems or some 3GPP systems. But "base station" is not universally used in all types of radio access technology (RAT). In some types of networks, the term "base station" may be replaced by "eNodeB", or "eNB", or "access point". For the purposes of simplicity and consistency, the term "base station" is used in this disclosure document, and in the claims in particular, to refer to the network infrastructure device that provides wireless access to user equipment.

[0026] Similarly, the term "mobile device" may be commonly used in some types of networks, but not in others. In some types of networks, the term "mobile device" may be replaced by "user equipment", "subscriber station", "mobile station", "remote terminal", "wireless terminal" or the like. For the purposes of simplicity and consistency, the term "mobile device" may be used in this disclosure document to refer to any remote wireless device that accesses the network infrastructure device (i.e., the base station).

[0027] According to the principles of the present disclosure, mobile devices **121-123** may access Android™ server **150** via base stations **111** and **112** and network **110**. Android™ server **150** is operable to download APK files to mobile devices **121-123** as described hereafter. Android™ server **150** may be, for example, part of Google Play™ Store and/or Android Market™.

[0028] FIG. **2**A illustrates an exemplary XML file **200** produced by an Android™ package manager according to the principles of the present disclosure. An Android™ operating system uses a certificate to guarantee that an Android™ application has not been tampered with or corrupted. If an APK file is tampered with (e.g., binary content is changed after signing process), the Android™ operating system detects the corruption because the certificate is no